# CONTENTS

## NUMBER 58


P. M. HAUGHTON, D. B. SELLEN, and R. D. PRESTON: Dynamic Mechanical Properties of the Cell Wall of *Nitella opaca*. . 1

D. H. JENNINGS: Microelectrode Experiments with Potato Cells: A Reinterpretation of the Experimental Findings. . . 13

W. P. ANDERSON and E. J. REILLY: A Study of the Exudation of Excised Maize Roots after Removal of the Epidermis and Outer Cortex . . . . . 19

C. R. HOUSE and P. JARVIS: Effect of Temperature on the Radial Exchange of Labelled Water in Maize Roots. . . . . 31

J. C. FIDLER: The Metabolism of Acetaldehyde by Plant Tissues. 41

M. A. HUGHES: Studies on β-Glucosidase Production in Cultured Tissue of *Trifolium repens* L. . . . . 52

HELGI ÖPIK: Development of Cotyledon Cell Structure in Ripening *Phaseolus vulgaris* Seeds. . . . . 64

WENDY MAJOR and E. H. ROBERTS: Dormancy in Cereal Seeds. I. The Effects of Oxygen and Respiratory Inhibitors. . . 77

WENDY MAJOR and E. H. ROBERTS: Dormancy in Cereal Seeds. II. The Nature of the Gaseous Exchange in Imbibed Barley and Rice Seeds . . . . . 90

A. W. WHEELER: Changes in Auxins in Expanding and Senescent Primary Leaves of Dwarf French Bean (*Phaseolus vulgaris*). . 102

W. W. SCHWABE: Studies on the Role of the Leaf Epiderm in Photoperiodic Perception in *Kalanchoe Blossfeldiana* . . 108

B. SUTTON-JONES and H. E. STREET: Studies on the Growth in Culture of Plant Cells. III. Changes in Fine Structure during the Growth of *Acer pseudoplatanus*, L. Cells in Suspension Culture. 114

H. BAILEY WARD and B. DWAIN VANCE: Effects of Monochromatic Radiations on Growth of *Pelargonium* Callus Tissue . . 119

P. M. ROBINSON, D. PARK, and T. A. GRAHAM: Autotropism in Fungal Spores. . . . . 125

R. A. FISCHER: Resistance to Water Loss in the Mesophyll of Leek (*Allium porrum*) . . . . . 135

HANS MEIDNER: The Comparative Effect of Blue and Red Light on the Stomata of *Allium cepa* L. and *Xanthium pennsylvanicum*. . 146

Z. GLINKA and HANS MEIDNER: The Measurement of Stomatal Responses to Stimuli in Leaves and Leaf Discs. . . . . 152

# CONTENTS

## NUMBER 58


P. M. HAUGHTON, D. B. SELLEN, and R. D. PRESTON: Dynamic Mechanical Properties of the Cell Wall of *Nitella opaca*. . 1

D. H. JENNINGS: Microelectrode Experiments with Potato Cells: A Reinterpretation of the Experimental Findings. . . 13

W. P. ANDERSON and E. J. REILLY: A Study of the Exudation of Excised Maize Roots after Removal of the Epidermis and Outer Cortex . . . . . 19

C. R. HOUSE and P. JARVIS: Effect of Temperature on the Radial Exchange of Labelled Water in Maize Roots. . . . . 31

J. C. FIDLER: The Metabolism of Acetaldehyde by Plant Tissues. 41

M. A. HUGHES: Studies on β-Glucosidase Production in Cultured Tissue of *Trifolium repens* L. . . . . 52

HELGI ÖPIK: Development of Cotyledon Cell Structure in Ripening *Phaseolus vulgaris* Seeds. . . . . 64

WENDY MAJOR and E. H. ROBERTS: Dormancy in Cereal Seeds. I. The Effects of Oxygen and Respiratory Inhibitors. . . 77

WENDY MAJOR and E. H. ROBERTS: Dormancy in Cereal Seeds. II. The Nature of the Gaseous Exchange in Imbibed Barley and Rice Seeds . . . . . 90

A. W. WHEELER: Changes in Auxins in Expanding and Senescent Primary Leaves of Dwarf French Bean (*Phaseolus vulgaris*). . 102

W. W. SCHWABE: Studies on the Role of the Leaf Epiderm in Photoperiodic Perception in *Kalanchoe Blossfeldiana* . . 108

B. SUTTON-JONES and H. E. STREET: Studies on the Growth in Culture of Plant Cells. III. Changes in Fine Structure during the Growth of *Acer pseudoplatanus*, L. Cells in Suspension Culture. 114

H. BAILEY WARD and B. DWAIN VANCE: Effects of Monochromatic Radiations on Growth of *Pelargonium* Callus Tissue . . 119

P. M. ROBINSON, D. PARK, and T. A. GRAHAM: Autotropism in Fungal Spores. . . . . 125

R. A. FISCHER: Resistance to Water Loss in the Mesophyll of Leek (*Allium porrum*) . . . . . 135

HANS MEIDNER: The Comparative Effect of Blue and Red Light on the Stomata of *Allium cepa* L. and *Xanthium pennsylvanicum*. . 146

Z. GLINKA and HANS MEIDNER: The Measurement of Stomatal Responses to Stimuli in Leaves and Leaf Discs. . . . . 152

E. F. Cox: Cyclic Changes in Transpiration of Sunflower Leaves in a Steady Environment . . . . . 167

O. V. S. Heath and B. Orchard: Carbon Assimilation at Low Carbon Dioxide Levels. II. The Processes of Apparent Assimilation. . . . . 176

J. A. Raven: The Mechanism of Photosynthetic Use of Bicarbonate by *Hydrodictyon africanum*. . . . . 193

F. A. Smith: Rates of Photosynthesis in Characean Cells. II. Photosynthetic $^{14}CO_2$ Fixation and $^{14}C$-Bicarbonate Uptake by Characean Cells . . . . . 207

NUMBER 59

J. W. Holmes and S. Y. Shim: Diurnal Changes in Stem Diameter of Canary Island Pine Trees (*Pinus canariensis*, C. Smith) Caused by Soil Water Stress and Varying Microclimate . . . . 219

J. A. Raven: The Linkage of Light-stimulated Cl Influx to K and Na Influxes in *Hydrodictyon africanum* . . . . . 233

John Sinclair: The Influence of Light on the Ion Fluxes and Electrical Potential of the Leaf Cells of the Moss, *Hookeria lucens* 254

W. S. Pierpoint: Cytochrome Oxidase and Mitochondrial Protein in Extracts of Leaves of *Nicotiana glutinosa* L. Infected with Tobacco Mosaic Virus . . . . . 264

J. L. Hall and V. S. Butt: Localization and Kinetic Properties of β-Glycerophosphatase in Barley Roots . . . . . 276

J. Edelman and S. P. Singh: Studies on the Biochemical Basis of Physiological Processes in the Potato Tuber. Changes in Nucleic Acids and Proteins in the Sprouting Tuber . . . . 288

L. Coke and W. J. Whittington: The Role of Boron in Plant Growth. IV. Interrelationships between Boron and Indol-3yl-acetic Acid in the Metabolism of Bean Radicles . . . . 295

G. L. Wilson and M. M. Ludlow: Bean Leaf Expansion in Relation to Temperature . . . . . 309

J. E. Dale: Cell growth in expanding primary leaves of *Phaseolus* . 322

C. F. Jenner, P. F. Saunders, and G. E. Blackman: The Uptake of Growth Substances. X. The Accumulation of Phenoxyacetic Acid and 2,4-Dichlorophenoxyacetic Acid by Segments of *Avena* Mesocotyl . . . . . 333

C. F. Jenner, P. F. Saunders, and G. E. Blackman: The Uptake of Growth Substances. XI. Variations in the Accumulation of Substituted Phenoxyacetic Acids of Differing Physiological Activity by Segments of *Avena* Mesocotyl . . . . . 353

A. J. Peel and J. Ford: The Movement of Sugars into the Sieve Elements of Bark Strips of Willow. II. Evidence for two Pathways from the Bathing Solution . . . . . 370

D. J. F. Bowling: Translocation at 0° in *Helianthus annuus* . 381

Jadwiga Skierczyńska: Some of the Electrical Characteristics of the Cell Membrane of *Chara australis* . . . . . 389

Jadwiga Skierczyńska: The Electrical Resistance of the Tonoplast. of *Chara australis* . . . . . 407

## NUMBER 60

P. J. Whitney, J. G. Vaughan, and J. B. Heale. A Disc Electrophoretic Study of the Proteins of *Verticillium albo-atrum*, *Verticillium dahliae*, and *Fusarium oxysporum* with Reference to their Taxonomy . . . . . 415

M. A. Hughes. Studies on the β-glucosidase system of *Trifolium repens* L. . . . . 427

R. M. M. Crawford and M. McManmon. Inductive Responses of Alcohol and Malic Dehydrogenases in Relation to Flooding Tolerance in Roots. . . . . 435

F. A. Smith. Metabolic Effects on Ion Fluxes in *Tolypella intricata* 442

N. J. Pinfield. The Effects of Gibberellin on the Metabolism of Ethanol-soluble Constituents in the Cotyledons of Hazel Seeds (*Corylus avellana* L.) . . . . . 452

S. Moreshet, G. Stanhill, and D. Koller. A Radioactive Tracer Technique for the Direct Measurement of the Diffusion Resistance of Stomata . . . . . 460

M. G. T. Shone. Electrochemical Relations in the Transfer of Ions to the Xylem Sap of Maize Roots . . . . . 468

G. E. Briggs. Passive Movement of Water and Solutes into the Absorbing Region of the Root . . . . . 486

Hanoch Bielorai. Beta-ray Gauging Technique for Measuring Leaf Water Content Changes of Citrus Seedlings as Affected by the Moisture Status in the Soil . . . . . 489

Brenda J. Nelmes and R. D. Preston. Wall Development in Apple Fruits: A Study of the Life History of a Parenchyma Cell. . 496

BRENDA J. NELMES and R. D. PRESTON. Cellulose Microfibril Orientation in Rubbery Wood . . . . . 519

O. P. JONES and H. J. LACEY. Gibberellin-like Substances in the Transpiration Stream of Apple and Pear Trees . . . . 526

M. G. MULLINS. Regulation of Inflorescence Growth in Cuttings of the Grape Vine (*Vitis vinifera* L.) . . . . . 532

MARGARET E. BROWN, R. M. JACKSON, and the late SUSAN K. BURLINGHAM. Effects Produced on Tomato Plants, *Lycopersicum esculentum*, by Seed or Root Treatment with Gibberellic Acid and Indol-3yl-Acetic Acid . . . . . 544

V. RAGHAVAN. A Role for Purines and Pyrimidines of Ribonucleic Acid in the Induction of Two-dimensional Growth in the Gametophytes of the Fern, *Asplenium nidus* . . . . . 553

D. MISHRA and B. MOHANTY. B-Nine Reversal of Benzimidazole- or IAA-induced Inhibition of Growth and Yield of Cowpea Plants . . . . . 567

M. M. EDWARDS. Dormancy in Seeds of Charlock. I. Developmental Anatomy of the Seed . . . . . 575

M. M. EDWARDS. Dormancy in Seeds of Charlock. II. The Influence of the Seed Coat . . . . . 583

M. M. EDWARDS. Dormancy in Seeds of Charlock. III. Occurrence and Mode of Action of an Inhibitor associated with Dormancy . 601

W. J. CRAM. The Effects of Ouabain on Sodium and Potassium Fluxes in Excised Root Tissue of Carrot . . . . . 611

I. D. J. PHILLIPS. Nitrogen, Phosphorus, and Potassium Distribution in Relation to Apical Dominance in Dwarf Bean (*Phaseolus vulgaris*, c.v. Canadian Wonder) . . . . . 617

G. D. WESTON and H. E. STREET. The Effects of 1-Naphthylacetic Acid on the Growth of Excised Tomato Roots . . . . 628

## NUMBER 61

W. P. ANDERSON and JOANNA LONG. Longitudinal Water Movement in the Primary Root of *Zea mays* . . . . . 637

W. P. ANDERSON and E. J. REILLY. The Effects of Temperature on the Exudation Process of Excised Primary Roots of *Zea mays* . . . . . 648

K. J. PARKINSON. Bio-electric Potentials of Intact Green Plants. III 658

M. E. GRANT and K. W. FULLER. Tissue Culture of Root Cells of *Vicia Faba* . . . . . 667

A. R. Sheldrake and D. H. Northcote. Some Constituents of Xylem Sap and their Possible Relationship to Xylem Differentiation . . . . . 681

E. W. Thompson and R. D. Preston. Evidence for a Structural Role of Protein in Algal Cell Walls. . . . . 690

Leonard Beevers and Walter E. Splittstoesser. Protein and Nucleic Acid Metabolism in Germinating Peas . . . . 698

J. A. Raven. The Action of Phlorizin on Photosynthesis and Light-Stimulated Ion Transport in *Hydrodictyon africanum* . . 712

J. G. Vaughan and K. E. Denford. An Acrylamide Gel Electrophoretic Study of the Seed Proteins of *Brassica* and *Sinapis* Species, with Special Reference to their Taxonomic Value . 724

P. C. L. John and P. J. Syrett. The Estimation of the Quantity of Isocitrate Lyase Protein in Acetate-Adapted Cells of *Chlorella pyrenoidosa* . . . . . 733

C. E. Price and W. O. James. Glycolysis in Extracted Wheat Nuclei . . . . . 742

M. D. El Khalifa and James A. Lippincott. The Influence of Plant-Growth Factors on the Initiation and Growth of Crown-Gall Tumours on Primary Pinto Bean Leaves. . . . . 749

D. J. Avery and H. J. Lacey. Changes in the Growth-regulator Content of Plum Infested with Fruit Tree Red Spider Mite, *Panonychus ulmi* (Koch) . . . . . 760

P. I. Orphanos and Walter Heydecker. On the Nature of the Soaking Injury of *Phaseolus vulgaris* Seeds . . . . . 770

C. Marshall and G. R. Sagar. The Interdependence of Tillers in *Lolium multiflorum* Lam. A Quantitive Assessment. . . 785

N. Terry. Developmental Physiology of Sugar Beet. . . . 795

D. M. Griffin and N. G. Nair. Growth of *Sclerotium rolfsii* at Different Concentrations of Oxygen and Carbon Dioxide . 812

E. F. Schneider. The Rest Period of Rhododendron Flower Buds . . . . . 817

D. S. Skene and V. Balodis. A Study of Vessel Length in *Eucalyptus obliqua* L'Herit . . . . . 825

G. d'Alessio and A. R. Trim. A Method for the Isolation of Nuclei from Leaves. . . . . 831

K. J. Parkinson. Apparatus for the Simultaneous Measurement of Water Vapour and Carbon Dioxide Exchanges of Single Leaves. 840

ANDERSON, W. P., and LONG, J. Longitudinal Water Movement in the Primary Roots of *Zea mays* . . . . . 637

ANDERSON, W. P., and REILLY, E. J. A Study of the Exudation of Excised Maize Roots after the Removal of the Epidermis and Outer Cortex . . . 19

ANDERSON, W. P., and REILLY, E. J. The Effects of Temperature on the Exudation Process of Excised Primary Roots of *Zea mays* . . . . . 648

AVERY, D. J., and LACEY, H. J. Changes in the Growth-Regulator Content of Plum Infested with Fruit Tree Red Spider Mite, *Panonychus ulmi* (Koch) . 760

BALODIS, V. *see* SKENE, D. S. . . . . .

BEEVERS, L. and SPLITTSTOESSER, W. E., Protein and Nucleic Acid Metabolism in Germinating Peas . . . . . 698

BIELORAI, HANOCH. Beta-ray Gauging Technique for Measuring Leaf Water Content Changes of Citrus Seedlings as Affected by the Moisture Status in the Soil . . . . . 489

BLACKMAN, G. E., *see* JENNER, C. F. . . . . .

BOWLING, D. J. F. Translocation at 0° in *Helianthus annus* . . . . . 381

BRIGGS, G. E. Passive Movement of Water and Solutes into the Absorbing Region of the Root . . . . . 486

BROWN, M. E., JACKSON, R. M., and the late SUSAN K. BURLINGHAM. Effects Produced on Tomato Plants, *Lycopersicum esculentum*, by Seed or Root Treatment with Gibberellic Acid and Indol-3yl-acetic Acid . . . . . 544

BURLINGHAM, S. K., *see* BROWN, M. E. . . . . .

BUTT, V. S., *see* HALL, J. L. . . . . .

COKE, L., and WHITTINGTON, W. J. The Role of Boron in Plant Growth. IV. Interrelationships Between Boron and Indo-3yl-acetic Acid in Metabolism of Bean Radicles . . . . . 295

COX, E. F. Cyclic Changes in Transpiration of Sunflower Leaves in a Steady Environment . . . . . 167

CRAM, W. J. The Effects of Ouabain on Sodium and Potassium Fluxes in Excised Root Tissue of Carrot . . . . . 611

CRAWFORD, R. M. M., and MCMANMON, M. Inductive Responses of Alcohol and Malic Dehydrogenases in Relation to Flooding Tolerance in Roots . . 435

DALE, J. E. Cell Growth in Expanding Primary Leaves of *Phaseolus* . . 322

D'ALESSIO, G., and TRIM A. R. A Method for the Isolation of Nuclei from Leaves 831

DENFORD, K. E., *see* VAUGHAN, J. G. . . . . .

EDELMAN, J., and SINGH, S. P. Studies on the Biochemical Basis of Physiological Process in the Potato Tuber. Changes in Nucleic Acids and Proteins in the Sprouting Tuber. . . . . 288

EDWARDS, M. M. Dormancy in Seeds of Charlock. I. Developmental Anatomy of the Seed . . . . . 575

EDWARDS, M. M. Dormancy in Seeds of Charlock. II. The Influence of the Seed Coat . . . . . 583

EDWARDS, M. M. Dormancy in Seeds of Charlock. III. Occurrence and Mode of Action of an Inhibitor Associated with Dormancy . . . . . 601

EL KHALIFA, M. D., and LIPPINCOTT, JAMES A. The Influence of Plant-Growth Factors on the Initiation and Growth of Crown-gall Tumours on Primary Pinto Bean Leaves. . . . . 749

FIDLER, J. C. The Metabolism of Acetaldehyde by Plant Tissues . . 41

FISCHER, R. A. Resistance to Water Loss in the Mesophyll of Leek . . 135

FORD, J., *see* PEEL, A. J. . . . . .

FULLER, K. W., *see* GRANT, M. E. . . . . .

GLINKA, Z., and HANS MEIDNER. The Measurement of Stomatal Responses to Stimuli in Leaves and Leaf Discs. . . . . 152

GRAHAM, T. A., *see* ROBINSON, P. M. . . . . .

GRANT, M. E., and FULLER, K. W. Tissue Culture of Root Cells of *Vicia faba* 667

GRIFFIN, D. M., and NAIR, N. G. Growth of *Sclerotium rolfsii* at Different Concentrations of Oxygen and Carbon Dioxide . . . . . 812

HALL, J. L., and BUTT, V. S. Localization and Kinetic Properties of β-Glycerophosphatase in Barley Roots . . . . . 276

HAUGHTON, P. M., SELLEN, D. B., and PRESTON, R. D. Dynamic Mechanical Properties of the Cell Wall of *Nitella opaca* . . . . . 1

HEALE, J. B., *see* VAUGHAN, J. G. . . . . .

HEATH, O. V. S., and ORCHARD, B. Carbon Assimilation at Low Carbon Dioxide Levels. II. The Processes of Apparent Assimilation . . . . . 176

HEYDECKER, W. *see* ORPHANOS, P. I. . . . . .

HOLMES, J. W., and SHIM, S. Y. Diurnal Changes in Stem Diameter of Canary Island Pine Trees (*Pinus canariensis*, C. Smith) Caused by Soil Water Stress and Varying Microclimate. . . . . 219

HOUSE, C. R., *see* JARVIS, P. . . . . .

HOUSE, C. R., and JARVIS, P. Effect of Temperature on the Radial Exchange of Labelled Water in Maize Roots . . . . . 31

HUGHES, M. A. Studies on β-Glucosidase Production in Cultured Tissue of *Trifolium repens* L. . . . . 52

HUGHES, M. A. Studies on the β-Glucosidase System of *Trifolium repens* L. . 427

JACKSON, R. M., *see* BROWN, M. E. . . . . .

JAMES, W. O., *see* PRICE, C. E. . . . . .

JENNER, C. F., SAUNDERS, P. F., and BLACKMAN, G. E. The Uptake of Growth Substances. X. The Accumulation of Phenoxyacetic Acid and 2,4-Dichlorophenoxyacetic Acid by Segments of *Avena* Mesocotyl . . . . . 333

JENNER, C. F., SAUNDERS, P. F., and BLACKMAN, G. E. The Uptake of Growth Substances. XI Variations in the Accumulation of Substituted Phenoxyacetic Acids of Differing Physiological Activity by Segments of *Avena* Mesocotyl 353

JENNINGS, D. H. Microelectrode Experiments with Potato Cells: A Reinterpretation of the Experimental Findings. . . . . 13

JOHN, P. C. L., and SYRETT, P. J. The Estimation of the Quantity of Isocitrate Lyase Protein in Acetate-adapted Cells of *Chlorella pyrenoidosa* . . . . 733

JONES, O. P., and LACEY, H. J. Gibberellin-like Substances in the Transpiration Stream of Apple and Pear Trees . . . . . 526

KOLLER, D. *see* MORESHET, S. . . . . .

LACEY, H. J., *see* AVERY, D. J. .
LACEY, H. J., *see* JONES, O. P. .
LIPPINCOTT, JAMES, A., *see* EL KHALIFA, M. D. .
LONG, J., *see* ANDERSON, W. P.
LUDLOW, M. M., *see* WILSON, G. L.
MAJOR, WENDY, and ROBERTS, E. H. Dormancy in Cereal Seeds. I. The Effects of Oxygen and Respiratory Inhibitors . . . 77
MAJOR, WENDY, and ROBERTS, E. H. Dormancy in Cereal Seeds. II. The Nature of Gaseous Exchange in Imbibed Barley and Rice Seeds. . . . 90
MARSHALL, C., and SAGAR, G. R. The Interdependence of Tillers in *Lolium multiflorum* Lam. A Quantitive Assessment. . . . 785
MCMANMON, M., *see* CRAWFORD, R. M. M.
MEIDNER, HANS. The Comparative of Blue and Red Light on the Stomata of *Allium cepa* L. and *Xanthium pennsylvanicum*. . . . 146
MEIDNER, HANS., *see* GLINKA, Z.
MISHRA, D., and MOHANTY, B. B-nine Reversal of Benzimidazole- or IAA-induced Inhibition of Growth and Yield of Cowpea Plants . . . 567
MOHANTY, B., *see* MISHRA, D. .
MORESHET, S., STANHILL, G., and KOLLER, D. A Radioactive Tracer Technique for the Direct Measurement of the Diffusion Resistance of Stomata. . . 460
MULLINS, M. G. Regulation of Inflorescence Growth in Cuttings of the Grape Vine (*Vitis vinifera* L.). . . . 532
NAIR, N. G., *see* GRIFFIN, D. M.
NELMES, BRENDA J., and PRESTON, R. D. Wall Development in Apple Fruits: A Study of the Life History of a Parenchyma Cell . . . 496
NELMES, BRENDA J., and PRESTON, R. D. Cellulose Microfibril Orientation in Rubbery Wood. . . . 519
NORTHCOTE, D. H., *see* SHELDRAKE, A. R.
ÖPIK, HELGI. Development of Cotyledon Cell Structure in Ripening *Phaseolus vulgaris* Seeds . . . 64
ORCHARD, B., *see* HEATH, O. V. S.
ORPHANOS, P. I., and HEYDECKER, WALTER. [On the Nature of the Soaking Injury of *Phaseolus vulgaris* Seeds . . . 770
PARK, D., *see* ROBINSON, P. M.
PARKINSON, K. J. Bio-electric Potentials of Intact Green Plants . . . 658
PARKINSON, K. J. Apparatus for the Simultaneous Measurement of Water Vapour and Carbon Dioxide Exchanges of Single Leaves . . . 840
PEEL, A. J., and FORD, J. The Movement of Sugars into the Sieve Elements of Bark Strips of Willow. II. Evidence for two Pathways from the Bathing Solution . . . 370
PHILLIPS, I. D. J. Nitrogen, Phosphorus, and Potassium Distribution in Relation to Apical Dominance in Dwarf Bean (*Phaseolus vulgaris*, c.v. Canadian Wonder) . . . 617

PIERPOINT, W. S. Cytochrome Oxidase and Mitochondrial Protein in Extracts of Leaves of *Nicotiana glutinosa* L. Infected with Tobacco Mosaic Virus . 264

PINFIELD, N. J. The Effects of Gibberellin on the Metabolism of Ethanol-soluble Constituents in the Cotyledons of Hazel Seeds (*Corycus avellana* L.) . . 452

PRESTON, R. D., *see* HAUGHTON, P. M. . . . . .

PRESTON, R. D., *see* NELMES, BRENDA J. . . . . .

PRESTON, R. D., *see* THOMPSON, E. W. . . . . .

PRICE, C. E., and JAMES, W. O. Glycolysis in Extracted Wheat Nuclei . . 742

RAGHAVAN, V. A Role for Purines and Pyrimidines of Ribonucleic Acid in the Induction of Two-dimensional Growth in the Gametophytes of the Fern, *Asplenium nidus* . . . . . 553

RAVEN, J. A. The Mechanism of Photosynthetic Use of Bicarbonate by *Hydrodictyon africanum* . . . . . 193

RAVEN, J. A. The Linkage of Light-Stimulated Cl Influx to K and NA Influxes in *Hydrodictyon africanum* . . . . . 233

RAVEN, J. A. The Action of Phlorizin on Photosynthesis and Light-Stimulated Ion Transport in *Hydrodictyon africanum* . . . . . 712

REILLY, E. J., *see* ANDERSON, W. P. . . . . .

ROBERTS, E. H., *see* MAJOR, WENDY . . . . . .

ROBINSON, P. M., PARK, D., and GRAHAM, T. A. Autotropism in Fungal Spores 125

SAGAR, G. R., *see* MARSHALL, C. . . . . .

SAUNDERS, P. F., *see* JENNER, C. F. . . . . .

SCHNEIDER, E. F. The Rest Period of Rhododendron Flower Buds . . 817

SCHWABE, W. W. Studies on the Role of the Leaf Epiderm in Photoperiodic Perception in *Kalanchoe Blossfeldiana* . . . . . 108

SELLEN, D. B., *see* HAUGHTON, P. M . . . . . .

SHELDRAKE, A. R., and NORTHCOTE, D. H. Some Constituents of Xylem Sap and their Possible Relationship to Xylem Differentiation. . . . . 681

SHIM, S. Y., *see* HOLMES, J. W. . . . . .

SHONE, M. G. T. Electrochemical Relations in the Transfer of Ions to the Xylem Sap of Maize Roots . . . . . 468

SINCLAIR, J. The Influence of Light on the Ion Fluxes and Electrical Potential of the Leaf Cells of the Moss, *Hookeria lucens* . . . . . 254

SINGH, S. P., *see* EDELMAN, J. . . . . .

SKENE, D. S., and BALODIS, V. A Study of Vessel Length in *Eucalyptus obliqua* L'Herit. . . . . 825

SKIERCZYŃSKA, J. Some of the Electrical Characteristics of the Cell Membrane of *Chara australis* . . . . . 389

SKIERCZYŃSKA, J. The Electrical Resistance of the Tonoplast. of *Chara australis* 407

SMITH, F. A. Rates of Photosynthesis in Characean Cells. II. Photosynthetic $^{14}CO_2$ Fixation and $^{14}C$-Bicarbonate Uptake by Characean Cells . . . 207

SMITH, F. A. Metabolic Effects on Ion Fluxes in *Tolypella intricata* . . 442

SPLITTSTOESSER, W. E., *see* BEEVERS, L. . . . . .

STANHILL, G., *see* MORESHET, S.

STREET, H. E., *see* WESTON, G. D.

STREET, H. E., *see* SUTTON-JONES, B.

SUTTON-JONES, B., and STREET, H. E. Studies on the Growth in Culture of Plant Cells. III. Changes in Fine Structure During the Growth of *Acer pseudoplatanus* L. Cells in Suspension Culture . . . . . 114

SYRETT, P. J., *see* JOHN, P. C. L.

TERRY, N. Developmental Physiology of Sugar Beet. . . . . 795

THOMPSON, E. W., and PRESTON, R. D. Evidence for a Structural Role of Protein in Algal Cell Walls. . . . . 690

TRIM, A. R., *see* D'ALESSIO, G.

VANCE, B. DWAIN, *see* WARD, H. BAILEY

VAUGHAN, J. G., and DENFORD, K. E. An Acrylamide Gel Electrophoretic Study of the Seed Proteins of *Brassica* and *Sinapis* Species, with Special Reference to their Taxonomic Value. . . . . 724

VAUGHAN, J. G., *see* WHITNEY, P. J.

WARD, H. BAILEY, and VANCE, B. DWAIN. Effects of Monochromatic Radiations on Growth of *Pelargonium* Callus's Tissue. . . . . 119

WESTON, G. D., and STREET, H. E. The Effects of 1-Naphthylacetic Acid on the Growth of Excised Tomato Roots. . . . . 628

WHEELER, A. W. Changes in Auxins in Expanding and Senescent Primary Leaves of Dwarf French Bean (*Phaseolus vulgaris*). . . . . 102

WHITNEY, P. J, VAUGHAN, J. G., and HEALE, J. B. A Disc Electrophoretic Study of the Proteins of *Verticillium albo-atrum*, *Verticillium dahliae*, and *Fusarium oxysporum* with Reference to their Taxonomy. . . . . 415

WHITTINGTON, W. J., *see* COKE, L.

WILSON, G. L., and LUDLOW, M. M. Bean Leaf Expansion in Relation to Temperature. . . . . 309